

The Triton Preprint Template

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Abstract

The **Triton** template is a modern, feature-rich L^AT_EX document class designed specifically for academic preprints in machine learning, computer science, and related fields. This comprehensive guide demonstrates every feature of the template: from basic typography and color schemes to advanced mathematical notation, algorithm formatting, and multi-author collaboration tools. Whether you're writing your first paper or are a seasoned researcher, this template provides everything you need to create professional, beautiful documents that stand out. The template emphasizes clean design, excellent typography, flexible metadata handling, and extensive customization options while maintaining compatibility with major academic publishing workflows.

Disclaimer

This instruction documents was automatically generated by AI (based on other files) and the content may (and should) contain factual errors, hallucinations, or misleading information. Readers are strongly advised to independently verify all information before relying on or distributing this document.

1 Welcome to Triton

Welcome to **Triton**¹, a comprehensive L^AT_EX template designed for the modern academic researcher. This template goes far beyond basic document formatting to provide:

- **Professional Typography:** Clean, readable fonts optimized for both screen and print
- **Flexible Author Management:** Handle complex authorship with affiliations, contributions, and correspondence
- **Rich Metadata Support:** Add licenses, repositories, versions, and custom metadata
- **Extensive Math Support:** 500+ predefined mathematical commands and symbols
- **Modern Color Palette:** Carefully chosen brand colors that enhance readability

¹Named after UC San Diego's mascot, the Triton.

- **Algorithm Formatting:** Beautiful algorithm and code presentation
- **Table & Figure Tools:** Professional layouts with subcaptions and references

This document serves as both a comprehensive feature demonstration and a practical starting point for your own papers.

2 Getting Started

2.1 Quick Start Guide

Ready to create your first paper with Triton? Follow these simple steps:

1. **Copy this template:** Download the template files to your working directory
2. **Update metadata:** Edit the title, authors, and affiliations in the preamble
3. **Write your content:** Replace the example sections with your research
4. **Compile with pdflatex:** Run `pdflatex paper.tex` to generate your PDF

2.2 Document Class Options

Every Triton document begins with the document class declaration:

Document Class Options

```
\documentclass{triton}           % Single column (default)
\documentclass[twocolumn]{triton} % Two column layout
\documentclass[preprint]{triton}  % Preprint mode (larger margins)
```

The template automatically loads essential packages and provides sensible defaults, so you can focus on content rather than formatting.

2.3 Title Block Configuration

The title block supports rich metadata through simple commands:

Essential Metadata Commands

```
\title{Your Paper Title}
\author[1,*,†]{First Author} % Affil, equal contrib, corre.
\author[2,*]{Second Author}  % Multiple affiliations possible
\affiliation[1]{Your Institution}
\contribution[*]{Equal contribution} % Explain superscripts
\correspondence{\email{you@email.com}}
\date{\today} % Or specific date
```

3 Typography and Visual Design

3.1 Professional Color Palette

Triton provides a carefully curated color palette inspired by UC San Diego's branding:

Color	Usage	Example
Navy	<code>\textcolor{ucsdnavy}{text}</code>	Headers, emphasis
Blue	<code>\textcolor{ucsdblue}{text}</code>	Links, accents
Gold	<code>\textcolor{ucsdgold}{text}</code>	Highlights, boxes
Light Blue	<code>\textcolor{ucsdlightblue}{text}</code>	Subtle accents
Gray	<code>\textcolor{ucsdgray}{text}</code>	Secondary text

These colors work harmoniously together and maintain excellent readability across different media.

3.2 Typography Features

The template includes several typography enhancements that make your papers look professional:

- **Bold text** for strong emphasis
- *Italic text* for subtle emphasis
- **Monospace text** for code and technical terms
- Small Caps for acronyms and special terms
- New term highlighting with the `\newterm{}` command

4 Mathematical Excellence

4.1 Rich Mathematical Notation

The template ships with over 500 predefined mathematical commands in `math_commands.tex`, making it easy to write beautiful equations. Here are some key categories:

4.1.1 Probability and Statistics

$$P_{\text{error}} = \mathbb{E}_{\mathbf{x} \sim p_{\text{data}}} [\mathbf{1}_{f(\mathbf{x}) \neq y}] \quad (1)$$

$$D_{\text{KL}}(p_{\text{data}} \parallel p_{\text{model}}) = \mathbb{E}_{\mathbf{x} \sim p_{\text{data}}} \left[\log \frac{p_{\text{data}}(\mathbf{x})}{p_{\text{model}}(\mathbf{x})} \right] \quad (2)$$

$$\mathcal{L}(\boldsymbol{\theta}) = -\mathbb{E}_{(\mathbf{x}, y) \sim \mathcal{D}} [\log p_{\text{model}}(y | \mathbf{x}; \boldsymbol{\theta})] \quad (3)$$

4.1.2 Linear Algebra

$$\mathbf{W} = [\mathbf{w}_1 \quad \mathbf{w}_2 \quad \cdots \quad \mathbf{w}_d]^T \quad (4)$$

$$\|\mathbf{x}\|_2 = \sqrt{\sum_{i=1}^n x_i^2} \quad (5)$$

$$\boldsymbol{\Sigma} = \mathbb{E}[(\mathbf{x} - \boldsymbol{\mu})(\mathbf{x} - \boldsymbol{\mu})^T] \quad (6)$$

4.1.3 Optimization

$$\boldsymbol{\theta}^* = \arg \min_{\boldsymbol{\theta}} \mathcal{L}(\boldsymbol{\theta}) \quad (7)$$

$$\boldsymbol{\theta}_{t+1} = \boldsymbol{\theta}_t - \alpha \nabla_{\boldsymbol{\theta}} \mathcal{L}(\boldsymbol{\theta}_t) \quad (8)$$

$$\text{s.t.} \quad \|\boldsymbol{\theta}\|_2 \leq \lambda \quad (9)$$

4.2 Convenient Math Shortcuts

The template provides shortcuts for common mathematical objects that save you time:

5 Theorem Environments

The template provides a complete set of theorem-like environments that automatically handle numbering and styling:

Definition 1 (Triton Template) A Triton template is a $\text{\LaTeX}$ document class that provides modern, professional formatting for academic preprints with minimal user configuration required.

Type	Command	Output
Vectors	<code>\vx</code> , <code>\vy</code> , <code>\vz</code>	$\mathbf{x}, \mathbf{y}, \mathbf{z}$
Matrices	<code>\mA</code> , <code>\mB</code> , <code>\mC</code>	$\mathbf{A}, \mathbf{B}, \mathbf{C}$
Tensors	<code>\tX</code> , <code>\tY</code> , <code>\tZ</code>	$\mathbf{X}, \mathbf{Y}, \mathbf{Z}$
Sets	<code>\sR</code> , <code>\sN</code> , <code>\sZ</code>	$\mathbb{R}, \mathbb{N}, \mathbb{Z}$
Calligraphic	<code>\gG</code> , <code>\gH</code> , <code>\gF</code>	$\mathcal{G}, \mathcal{H}, \mathcal{F}$
Random vars	<code>\rx</code> , <code>\ry</code> , <code>\rz</code>	x, y, z

Table 1: Mathematical notation shortcuts available in the template.

Theorem 1 (Template Completeness) For any reasonable academic paper structure $\mathcal{S}$, there exists a configuration of the Triton template that can elegantly represent $\mathcal{S}$.

Lemma 1 (Ease of Use) Learning to use the Triton template effectively requires $O(\log n)$ time where n is the number of features you wish to use.

Remark 1 The theorem environments automatically handle numbering, cross-references, and consistent styling throughout your document.

Example 1 (Quick Start) To create a new paper, simply copy this template file, update the metadata in the preamble, replace the content sections, and compile with *pdflatex*.

6 Algorithm Presentation

6.1 Beautiful Algorithm Formatting

The template provides beautiful algorithm formatting through the `algorithm` and `algpseudocode` packages:

Algorithm 1 Gradient Descent with Momentum

Require: Learning rate $\alpha > 0$, momentum parameter $\beta \in [0, 1)$

Require: Initial parameters θ_0 , initial velocity $\mathbf{v}_0 = \mathbf{0}$

```

1: for  $t = 0$  to  $T - 1$  do
2:   Sample mini-batch  $\mathcal{B}_t \subset \mathcal{D}$ 
3:   Compute gradient:  $\mathbf{g}_t = \frac{1}{|\mathcal{B}_t|} \sum_{(x,y) \in \mathcal{B}_t} \nabla_{\theta} \ell(\theta_t; x, y)$ 
4:   Update velocity:  $\mathbf{v}_{t+1} = \beta \mathbf{v}_t + (1 - \beta) \mathbf{g}_t$ 
5:   Update parameters:  $\theta_{t+1} = \theta_t - \alpha \mathbf{v}_{t+1}$ 
6: end for
7: return  $\theta_T$ 
```

6.2 Code Blocks

For code snippets, the template provides attractive colored boxes:

PyTorch Implementation Example

```
import torch
import torch.nn as nn

class TritonNet(nn.Module):
    def __init__(self, input_dim, hidden_dim, output_dim):
        super().__init__()
        self.layers = nn.Sequential(
            nn.Linear(input_dim, hidden_dim),
            nn.ReLU(),
            nn.Linear(hidden_dim, output_dim)
        )

    def forward(self, x):
        return self.layers(x)
```

7 Tables and Figures

7.1 Professional Tables

The template encourages the use of `booktabs` for clean, professional tables:

Method	Accuracy	Precision	Recall	F1-Score
Baseline	85.2	83.1	87.4	85.2
Triton-Net	92.7	91.5	93.8	92.6
State-of-art	89.3	88.7	90.1	89.4

Table 2: Performance comparison on the benchmark dataset. Bold indicates best results.

7.2 Figure Management

The template works seamlessly with figures and subfigures:



(a): UCSD Logo



(b): MBZUAI Logo

Figure 1: Example institutional logos showing the template’s figure handling capabilities.

You can reference individual subfigures (figure 1a and figure 1b) or the entire figure (figure 1) using the convenient reference commands.

8 Advanced Features

8.1 Flexible Lists

The template supports various list types with customizable spacing:

1. Numbered lists for sequential information
2. Nested capabilities for hierarchical content:

(a) Sub-item one

(b) Sub-item two

3. Custom formatting through the `enumitem` package

8.2 Hyperlinks and References

The template provides excellent support for cross-references and external links:

- Internal references: See section [A](#) for mathematical notation
- Algorithm references: Algorithm [1](#) shows optimization
- Table references: Results are summarized in [Table 2](#)
- External links: Visit [the repository](#) for updates
- Email links: Contact the maintainer at til040@ucsd.edu for support

8.3 Special Text Formatting

The template includes commands for specialized text formatting:

"The best templates are invisible to the user, allowing them to focus entirely on their content rather than formatting concerns."

You can also create highlighted text boxes for important information:

Pro Tip

Use the `\newterm{}` command to consistently highlight newly introduced technical terms throughout your document. This creates visual consistency and helps readers track important concepts.

9 Two-Column Layout

The template supports both single and two-column layouts. To enable two-column mode, simply pass the `twocolumn` option to the document class:

Two-Column Mode

```
\documentclass[twocolumn]{triton}
```

This is particularly useful for conference submissions that require two-column formatting.

10 Best Practices for Academic Writing

10.1 Recommended Workflow

Here's a proven workflow for using the Triton template effectively:

1. **Start with metadata:** Fill in all author information, affiliations, and metadata first
2. **Structure first:** Create your section headings and overall document structure
3. **Content second:** Focus on writing clear, concise content
4. **Formatting last:** Add figures, tables, and fine-tune formatting at the end

10.2 Customization Options

The template is designed to be easily customizable. Common modifications include:

- Adding new theorem environments with `\declaretheorem`
- Customizing colors by redefining the color palette

- Adding institution logos with `\addlogo`
- Including additional packages for specialized needs

10.3 Performance Tips

For large documents, consider these optimization strategies:

- Use `\includeonly{}` during drafting to compile only specific sections
- Keep figures in appropriate formats (PDF for vector graphics, PNG for photos)
- Use the `draft` option during editing to speed up compilation

11 Citations and Bibliography

The template works seamlessly with standard bibliography tools. For example, foundational works like [Lamport \(1994\)](#) and [Knuth \(1984\)](#) established the typesetting standards we follow today. You can also cite multiple works together ([Lamport, 1994; Knuth, 1984](#)).

The template supports various citation styles through the `natbib` package, making it easy to adapt to different journal requirements.

12 Getting Help and Support

12.1 Common Issues and Solutions

If you encounter problems, check these common issues:

- **Missing packages:** Ensure you have a complete $\text{\TeX}$ Live or $\text{MiK}\text{\TeX}$ installation
- **Font issues:** The template uses standard $\text{\LaTeX}$ fonts; ensure your installation is up-to-date
- **Color problems:** Verify that the `xcolor` package is properly installed
- **Algorithm formatting:** Make sure both `algorithm` and `algpseudocode` packages are available

12.2 Where to Find Help

If you need assistance:

1. Check the template repository for documentation and examples
2. Review this guide for feature explanations
3. Open an issue on GitHub for bug reports or feature requests
4. Contact the maintainer for specific questions

13 Contributing and Community

The Triton template is open source and welcomes contributions from the academic community! Ways to get involved include:

- Reporting bugs or suggesting improvements
- Adding new features or mathematical commands
- Improving documentation and examples
- Sharing your customizations with other researchers

Visit the repository to join the growing community of researchers using modern $\text{\LaTeX}$ tools.

14 Conclusion

The Triton template provides a comprehensive, modern solution for academic writing that balances beautiful design with practical functionality. Whether you're writing your first paper or your hundredth, this template adapts to your needs while maintaining professional standards.

Key benefits of using Triton include:

- **Time savings:** Spend more time on research, less on formatting
- **Professional appearance:** Create documents that look publication-ready
- **Consistency:** Maintain uniform formatting across all your papers
- **Flexibility:** Easily adapt to different journal and conference requirements
- **Community support:** Join a growing community of researchers using modern tools

We hope you find the Triton template useful for your academic writing needs. Happy writing!

References

Donald E. Knuth. The TeXbook, volume A of Computers & Typesetting. Addison–Wesley, 1984.

Leslie Lamport. LaTeX: A Document Preparation System. Addison–Wesley, 2nd edition, 1994.

Appendix

A Mathematical Command Reference

This appendix provides a quick reference for the most commonly used mathematical commands available in the template.

A.1 Vector and Matrix Notation

Category	Command Examples	Output Examples
Vectors	<code>\vx</code> , <code>\vy</code> , <code>\vz</code>	$\mathbf{x}, \mathbf{y}, \mathbf{z}$
Matrices	<code>\mA</code> , <code>\mB</code> , <code>\mC</code>	$\mathbf{A}, \mathbf{B}, \mathbf{C}$
Tensors	<code>\tX</code> , <code>\tY</code> , <code>\tZ</code>	$\mathbf{X}, \mathbf{Y}, \mathbf{Z}$
Random vectors	<code>\rvx</code> , <code>\rvy</code> , <code>\rvz</code>	$\mathbf{x}, \mathbf{y}, \mathbf{z}$
Matrix elements	<code>\emA</code> , <code>\emB</code> , <code>\emC</code>	A, B, C

Table 3: Vector and matrix notation commands.

A.2 Probability and Statistics

Command	Output	Description
<code>\E</code>	$\mathbb{E}$	Expectation operator
<code>\Var</code>	Var	Variance operator
<code>\Cov</code>	Cov	Covariance operator
<code>\KL</code>	D_{KL}	KL divergence
<code>\pdata</code>	p_{data}	Data distribution
<code>\pmodel</code>	p_{model}	Model distribution

Table 4: Probability and statistics notation.

A.3 Optimization and Learning

Command	Output	Description
<code>\argmax</code>	$\arg \max$	Argument maximum
<code>\argmin</code>	$\arg \min$	Argument minimum
<code>\Ls</code>	$\mathcal{L}$	Loss function
<code>\lr</code>	α	Learning rate
<code>\reg</code>	λ	Regularization parameter
<code>\train</code>	$\mathcal{D}$	Training dataset

Table 5: Optimization and learning theory notation.

B Template Customization Examples

B.1 Adding Custom Colors

You can extend the color palette by defining new colors in your preamble:

Custom Color Definition

```
\definecolor{myred}{RGB}{220,50,47}
\definecolor{mygreen}{RGB}{133,153,0}
\definecolor{myblue}{RGB}{38,139,210}
```

B.2 Custom Theorem Environments

Create specialized theorem environments for your research field:

Custom Theorems

```
\declaretheorem[name=Hypothesis]{hypothesis}  
\declaretheorem[name=Conjecture]{conjecture}  
\declaretheorem[name=Observation]{observation}
```